OBLON, SPIVAK, ET AL
DOCKET #: 208954US2RD CONT
INV: Hideaki FUKUZAWA, et al.
SHEET 10 OF 43

10/43

Fig.11

BIAS POINT OF FIRST COMPARATIVE CASE (No $Spin$ Filter x
Normal Pin)
    (- Controllability becomes bad to bring large Hpin to
just bias by large Hcu   (height dependency is large)
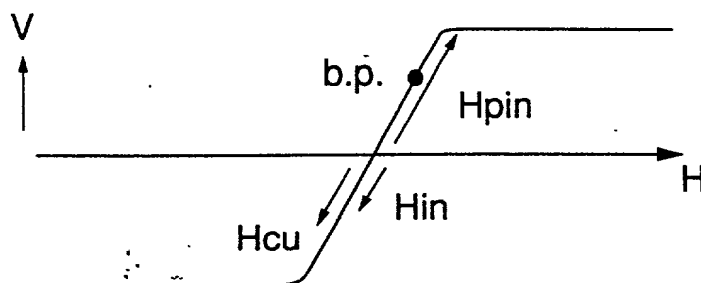   - Output drops because no Spin-Filter effect is utilized)

OBLON, SPIVAK, ET AL
DOCKET #: 208954US2RD CONT
INV: Hideaki FUKUZAWA, et al.
SHEET 11 OF 43

11/
43

Fig.12

BIAS POINT OF 2nd COMPARATIVE CASE (Spin Filter exists x Normal Pin)
(b.p. increases considerably more than 50% because Hpin is large and Hcu is small)

OBLON, SPIVAK, ET AL
DOCKET #: 208954US2RD CONT
INV: Hideaki FUKUZAWA, et al.
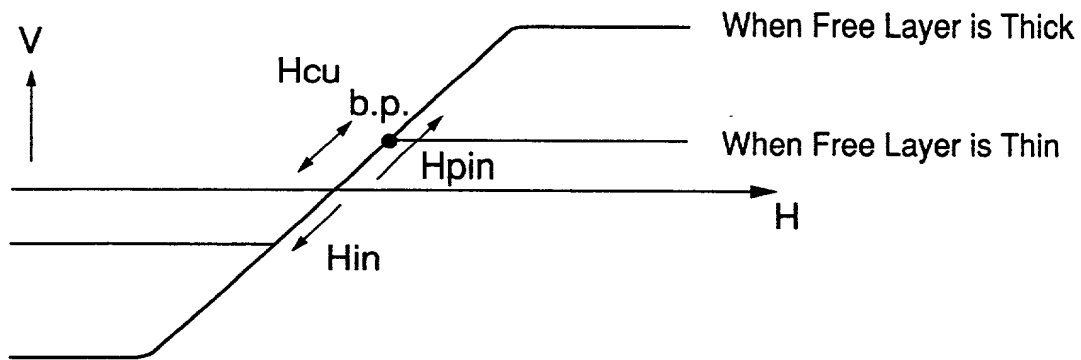SHEET 12 OF 43

12/43

Fig.13

BIAS POINT OF THIRD COMPARATIVE CASE
(-Bias point is stabilized when free layer is thick
just by decreasing Hcu.
-When free layer is thinned, influence of Hpin is
large and b.p. deviates. MR also deteriorates)